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Research Trend of Artificial Intelligence Application in Mathematics Education

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Abstract:
Technology plays an important role in mathematics education around the world. Artificial intelligence (AI) is one of the products of technology that is widely used in academic activities, which is also accompanied by many studies examining the use of Artificial intelligence in mathematics education. This paper aims to look at the research trends on AI in mathematics education. The Systematic Literature Review (SLR) method was used to review 35 articles from internationally reputable journals obtained from Scopus. The article search process used keywords namely AI, Artificial Intelligence, and mathematics education. The findings showed a sharp spike in the publication of AI articles in 2024, especially on chatbots. Chatbots have become the focus of AI research in mathematics education and are mostly conducted at the college level with student subjects. The application of AI in mathematics education is characterized by the function of AI to realize personalized learning. Finally, this paper recommends that future research should increase the diversity of research related to AI in mathematics education, especially among teachers and students at various levels given that students today can easily access AI. Debriefing on maintaining academic ethics is also needed to avoid misuse of AI in mathematics education.

Keywords: Artificial Intelligence, AI, Mathematics Education, Systematic Literature Review

1. Introduction

The industrial revolution 5.0 has begun to develop to shift the era of the industrial revolution 4.0. While many are still adapting to the industrial revolution 4.0, the discourse on the next revolution, namely the industrial revolution 5.0, has begun to run (Siagian, 2023). The novelty of this era focuses on the increasingly vital role of technology on the human side. If the industrial revolution 4.0 is characterized by the ease with which humans can access and disseminate information through the internet media, then the industrial revolution 5.0 is characterized by all technology becoming part of human life where humans and machines work together in improving the means and efficiency of a job (Dwiyama, 2021). Technology has developed rapidly and brought many changes in all sectors, one of which is education which is an important sector in human survival. Education is a vehicle for human resources to develop themselves (Agung et al., 2022). Global demands require the world of education to always adapt technological developments to efforts in improving the quality of education. In recent decades, Artificial Intelligence (AI) has become one of the most influential technologies in various fields, including education. One area that has received special attention is the application of AI in mathematics education.

Mathematics is a part of science that is very influential on the development of other fields of science (Auliya, 2019). As an important science, mathematics education should be able to be presented and implemented optimally to ensure that this knowledge can be accepted by students. Monotonous math education makes students bored and generally considers math a scary lesson and finds math problems difficult to do (Hasanah et al., 2021). In its development, AI-based products have been developed to support student learning success. This is certainly accompanied by increasing research interest in the application of AI in mathematics education. The integration of AI in mathematics education offers various opportunities including improving learning effectiveness (Boob & Radke, 2024; Norberg et al., 2024; Qiu et al., 2022; Udias et al., 2024), personalizing learning (Alvarez, 2024; Annuš & Kmeť, 2024; Inoferio et al., 2024; Walkington & Bernacki, 2019), and providing automatic feedback (Wardat et al., 2023). The application of

Artificial Intelligence (AI) in mathematics education has experienced significant growth and diversification in recent years. The peak of this research is in 2024, there is an intensive increase in the use of chatbots as a tool that can answer various questions and can be easily accessed by students. This trend reflects a broader shift towards integrating advanced technologies into educational practices, aiming to improve learning outcomes and personalize the educational experience.

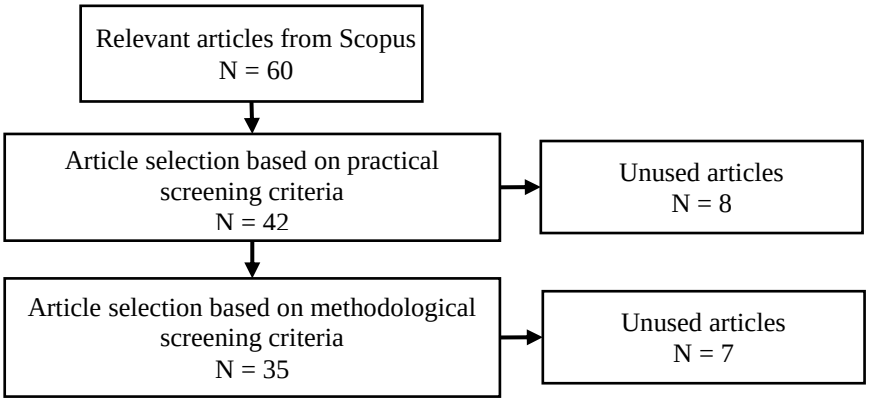
This paper discusses recent research trends on the application of AI in mathematics education. Research trends in this area reflect not only the potential of AI technology, but also the challenges that arise, such as gaps in access to technology, the need for deeper personalization, and ethical considerations in its use. The focus will be on the latest innovations, the benefits they offer, and the possible challenges that will be faced by actors in mathematics education. Understanding these trends will provide insights into how AI can change the way students learn mathematics and provide an overview of future research directions.

2. Research Methods

The method used in this scientific article is Systematic Literature Review (SLR) which focuses on the application of Artificial Intelligence in mathematics education. The literature reviewed in this study were 35 articles from Scopus indexed reputable journals obtained from Science Direct. There are six stages in this research, including: (1) selecting a research question, (2) selecting a database of articles and other sources, (3) selecting search keywords, (4) filtering articles based on the criteria set (5) conducting a review, and (6) synthesizing the results. The keywords used were artificial intelligence, AI, and mathematics education. The article search considered aspects such as the time of publication of articles from the last seven years.

The results of the article search collected 60 relevant articles which were further screened by applying criteria, namely, practical screening criteria in the form of suitability of the topic of the required research objectives and methodological screening criteria in the form of adequacy of research coverage and scientific quality of the article. Articles that did not meet these criteria were excluded from the next stage because they did not meet the eligibility criteria for further review. Next, a comprehensive review of the 35 selected articles was conducted based on seven main aspects, namely, (1) Scopus quartile ranking, (2) research subject, (3) research type, (4) AI product applied, (5) dependent variable, (6) mathematical topic, and (7) purpose of AI application

Figure 1: Article Screening Stage

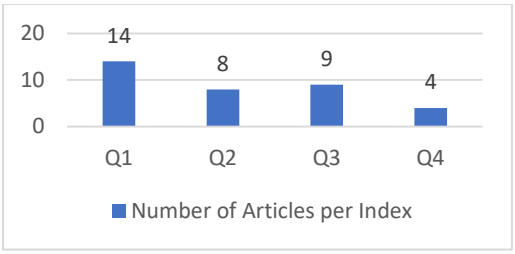


3. Results and Discussion

3.1 Results

1. Scopus Quartile

As the literature source of this study, the 35 selected articles were categorized based on the quartile ranking of the journal according to the Scopus index. The categories include Q1, Q2, Q3, and Q4 which indicate the order of decreasing quality. Figure 2 shows the number of research publications related to the application of Artificial Intelligence in mathematics education categorized by Scopus Quartile Ranking.



Gambar 2: Figure 2: Number of Studies by Scopus Quartile ranking

Based on the graph, publications in the highest quartile (Q1) dominate with a total of 14 articles. Q2 and Q3 quartiles have almost the same number of articles, with 8 and 9 articles respectively. Meanwhile, the lowest quartile (Q4) has the least number of articles, which is 4 articles. This data shows that most of the research in this topic was successfully published in high quality journals (Q1), reflecting the importance of the topic of artificial intelligence in mathematics education in the academic community. Publications in Q1 journals tend to have greater impact, so this choice reflects the ambition of researchers to reach a wider audience and make significant contributions to the literature. The small number of publications in the Q4 quartile (4 articles) indicates that researchers tend to avoid journals with lower reputations, even though these journals can be useful spaces to explore more innovative ideas or to reach a wider educational community

2. Type of Research

In this aspect, the review of articles was categorized based on six types of research including quantitative, qualitative, research and development (R&D), experimental, mixed method, and evaluation. Figure 3 shows the distribution of the number of studies on the application of Artificial Intelligence in mathematics education based on the type of research.

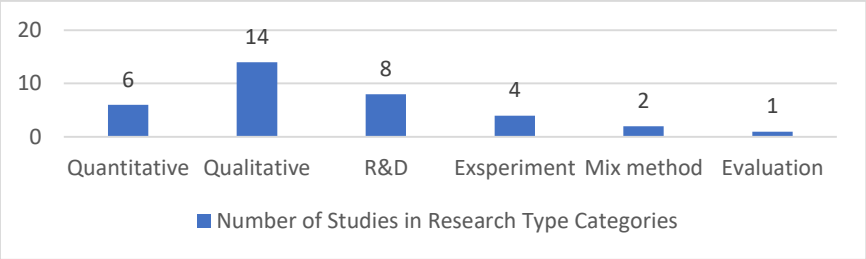


Figure 3: Number of Studies by Research Type

Based on the graph, the most dominant type of research is qualitative with 14 studies. R&D (Research and Development) came in second with 8 studies, followed by quantitative research with 6 studies. Other types of research, such as experimental, only recorded 4 studies, while mixed methods recorded 2 studies, and evaluation is the least research category, with 1 study. This data shows that a qualitative approach is more often used by researchers to explore the application of artificial intelligence in mathematics education. This could be due to the need to understand in-depth processes, such as how students and teachers respond to or adapt to AI-based technologies.

The dominance of qualitative research also points to the potential limitations of quantitative measurements and experiments based on statistical evidence, which only account for a small proportion of the total research. Although the research and development (R&D) type is significant (8 studies), this number still shows room for optimization, given the importance of AI-based tool development in mathematics learning. In addition, the low number of mixed methods (2 studies) and evaluation (1 study) research suggests that approaches that integrate qualitative and quantitative data or that focus on evaluating the impact of AI-based technology implementation have not been widely conducted. This is important to provide a more comprehensive picture of the effectiveness and efficiency of AI in the context of mathematics education.

3. Research Subject

The subjects of the research chosen in this case are not only limited to students at each level, but also consider other subjects such as teachers and books. Figure 4 shows the distribution of the number of studies related to the application of Artificial Intelligence in mathematics education based on the research subject.

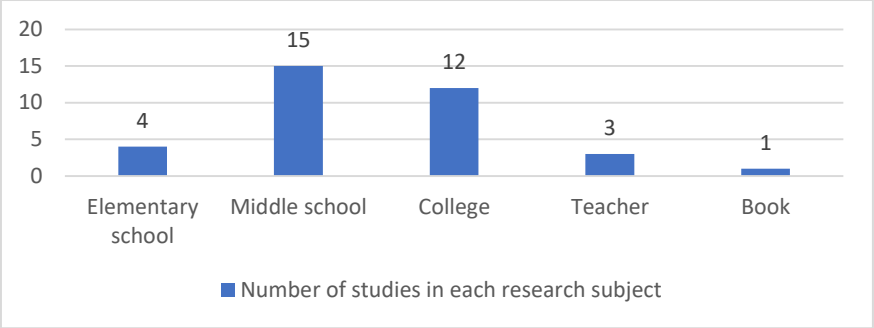


Figure 4: Number of Studies by Research Subject

Based on the graph, the most frequently selected research subjects were high school students with 15 studies, followed by university students with 12 studies. Other subjects, such as elementary school students, recorded only 4 studies, while research involving teachers and books only amounted to 1 study each. From this data, it can be seen that research in this topic is mostly focused on the secondary and tertiary education levels. This may be due to the higher relevance of artificial intelligence applications at these levels of education, both in terms of implementing AI-based learning technologies and measuring their effectiveness in improving the understanding of more complex mathematical concepts.

4. AI Products Applied in Mathematics Education

A wide range of AI-based products have been developed for application in mathematics education by previous researchers. In this paper, there are seven categories of AI products which include Chatbot, Game, Virtual Reality (VR), Platform, Robot, Guidance System, and Automatic Assessment.

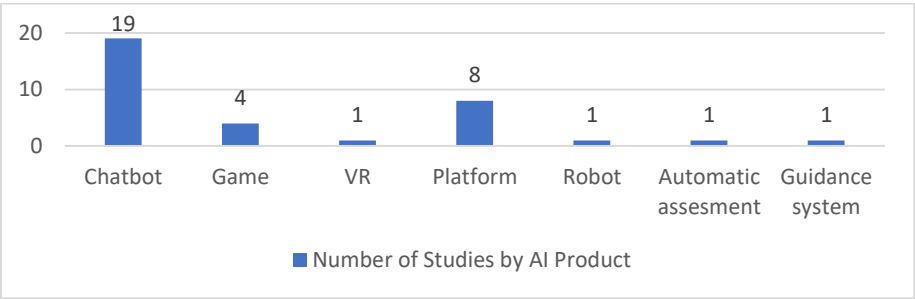


Figure 5: Number of Studies by AI Product

Figure 5 shows the distribution of the number of studies by category of AI applied in mathematics education. The most studied product is chatbot, with 19 studies. Most of these studies were published in 2024, indicating a surge of interest in chatbots in the field of research. Next, the platform category had 8 and games had 4 studies, while other categories such as VR, robots, guidance systems, and assessment had only 1 study each. This data shows that Chatbot, especially ChatGPT, occupies a prime position as the most researched AI product in the context of mathematics education. This is understandable given ChatGPT's ability to answer questions, explain concepts, and help students understand math material interactively, which makes it an interesting tool for exploration. The low number of other products such as VR (Virtual Reality) and robots may be due to the fact that the keywords of articles that do not use AI are relatively few.

5. Purpose of AI Product Application in Mathematics Education

The category of purpose of AI product application in this study refers to the dependent variable of the study on mathematics education. There are a variety of purposes given the breadth and richness of AI features so that innovations can be made to support the success of mathematics education. Table 1 summarizes the various purposes of AI product application in mathematics education based on the number of relevant studies.

Table 1: Dependent Variables of AI Application in Mathematics Education

No.	*Purpose of AI Application*	*Total Research*

1	Affective	6
2	Problem Solving	4
3	Math performance	5
4	Misconceptions	2
5	Personalized Learning	7
6	Teaching skills	3
7	Creativity	1
8	Concept Understanding	2
9	Simplification of questions	1
10	Assessment	2
11	Computational Thinking	2

The most frequent objective was to support personalized learning, with 7 studies. Next, a focus on the affective aspects of students including interest, motivation, attitude, and math anxiety was recorded in 6 studies, followed by the goals of improving math performance (5 studies) and supporting the problem solving process (4 studies). AI applications were also designed to support the development of teaching skills for teachers (3 studies) and improve students' problem solving (4 studies). In addition, some studies also targeted to address misconceptions in learning, concept understanding, and computational thinking with 2 studies each. Enhancing creativity and helping to simplify story problems to make them easier for students to understand were each addressed in 1 study. From this data, it can be seen that the applications of AI in mathematics education are very diverse, with personalized learning as the dominant area. This reflects the potential of AI to support students' individualized learning needs, which can provide a more adaptive and relevant learning experience.

6. Math Topics Adopted in AI Products

In the articles reviewed, six categories of mathematics topics were adopted in AI products to support the implementation of mathematics education. These topics include algebra, general mathematics, geometry, arithmetic operations, calculus, and statistics.

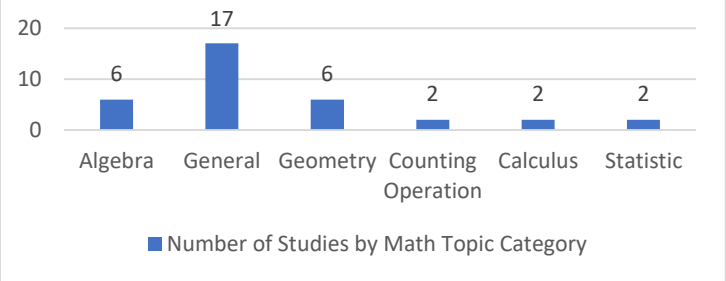


Figure 6: Number of Studies by Math Topic Category

The graph shows that general math is the topic with the highest adoption in AI-based research, with 17 studies. It is followed by Algebra and Geometry, which have 6 studies each. Other topics, such as Counting Operations, Calculus, and Statistics, have fewer studies, with 2 studies each. The high number of studies in the General Mathematics category may indicate the flexibility and breadth of AI applications in this topic, which may include logic, general problem solving, or basic math theory. The next two topics, Algebra and Geometry, also showed high interest. This could be due to the relevance of Algebra and Geometry in the development of visualization algorithms, such as pattern recognition and space-based data analysis.

7. Functions of AI Products in Mathematics Education

The function of AI products in this case focuses on their usefulness for application in mathematics education. The categories of functions include as a companion tutor, learning media, assessment tool, and as a lesson plan designer.

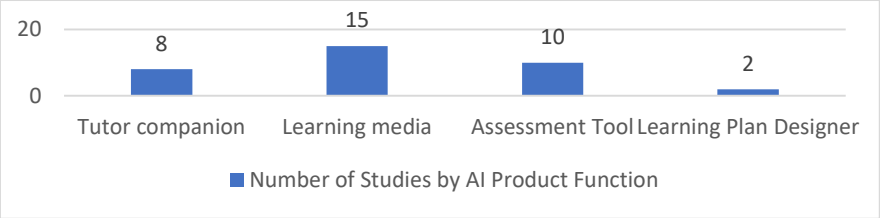


Figure 7: Number of Studies by AI Product Function

The graph in Figure 7 shows the distribution of the number of studies addressing different categories of Artificial Intelligence product functions in mathematics education. Based on the data shown, the Learning Media category is the most researched area, with a total of 15 studies. This shows a major focus on using AI to support interactive learning and provide more adaptive and dynamic materials. In second place, the Assessment Tools category was recorded with 10 studies. This indicates that AI has a significant role in assisting the learning evaluation process, such as providing automated feedback and analyzing student learning outcomes. Meanwhile, the Accompanying Tutor category had 8 studies reflecting the potential of AI in providing personalized guidance to students, for example through chatbots or adaptive learning systems. However, utilizing AI to Design Lesson Plans showed the least number of studies, with only 2 studies. This may be due to the challenges of integrating AI into the planning process which often requires deep pedagogical context.

3.2 Discussion

The application of Artificial Intelligence (AI) in mathematics education has experienced significant growth and diversification in recent years. This trend reflects a broader shift towards integrating advanced technologies into educational practices, aiming to improve learning outcomes and personalize the educational experience. The integration of artificial intelligence (AI) in mathematics education has emerged as a transformative approach, which enhances the learning experience and addresses challenges such as math anxiety and lack of confidence among students. The application of AI in mathematics education is dominated by its function as a learning medium. Learning media can improve the quality of the student learning process in teaching which in turn is expected to improve the learning outcomes achieved (Sudjana & Rivai, 2010). Articles published in 2024 show the significant impact of using artificial intelligence (AI) especially Chatbots in mathematics education.

Gouia-Zarrad and Gunn (2024) found that ChatGPT can enhance students' learning experience in math classes. Wu et al. (2024) showed that the integration of peer assessment cycle with ChatGPT can improve students' knowledge, skills, and attitudes towards STEM education. In addition, the pedagogical implications of AI in mathematics education extend to improving problem-solving skills and encouraging collaborative learning environments. Similarly, Getenet (2024) highlighted prospective teachers' positive attitudes towards AI systems, emphasizing their effectiveness in supporting student learning and engagement. The potential of AI to provide customized feedback and adaptive learning experiences is further supported by Alvarez (2024), who reported significant improvements in calculus learning outcomes when using AI-supported tutors.

In addition to enhancing individual learning experiences, AI tools such as ChatGPT have been recognized for their ability to facilitate collaborative problem solving. Yunianto et al. (2024) describe how ChatGPT can assist students in solving complex geometry tasks, thereby enhancing independent problem solving skills and personalized learning. This is in line with the findings of Urban et al. (2024), who showed that ChatGPT improved creative problem-solving performance among university students. Recent studies have also highlighted the effectiveness of AI tools in supporting affective aspects in students. Inoferio et al. (2024) showed that AI models serve as mentors offering step-by-step explanations and personalized assistance, which can help students manage anxiety and build confidence in their mathematical abilities.

The integration of AI in educational settings has been shown to optimize existing curricula and teaching methodologies, thereby addressing contemporary educational challenges (Tan, 2022). Furthermore, Delima et al. (2024) explored the interaction between AI and academic achievement, showing that the use of AI in educational environments can enhance students' independent learning and reduce anxiety. Bayaga (2024) showed that AI-driven environments can improve math problem-solving skills. This sentiment was echoed by Torres-Peña et al. (2024), who noted that AI tools facilitate interactive learning experiences that deepen students' understanding of complex concepts such as calculus through sustained engagement with

virtual tutors. Overall, these articles emphasize the potential of AI in improving mathematics learning outcomes, supporting more inclusive learning, and addressing the challenges students face in mathematics education.

Despite promising progress, the implementation of AI in mathematics education is not without its challenges. Research by Wardat et al. (2024) suggests that while AI can serve as an effective educational tool, teachers often face significant hurdles in its application, including the need for additional effort compared to traditional teaching methods and the pressures associated with integrating new technologies into an existing curriculum. Furthermore, the perceived efficacy of AI-based teaching applications varies among educators, necessitating professional development and support to facilitate effective integration (Chou et al., 2023). The role of teachers remains critical in the successful implementation of AI in mathematics education. Research has shown that the involvement of math teachers along with AI tools can improve student engagement and learning outcomes (Thomas et al., 2023). This collaborative approach is important to maximize the benefits of AI technology, as teachers can provide the necessary guidance and support that AI systems alone cannot provide. In addition, the pedagogical implications of AI require careful consideration of ethical issues, particularly those concerning bias and equitable distribution of educational resources (Lee & Perret, 2022).

4. Conclusion

Research trends show that AI has great potential to revolutionize mathematics education, but it also requires attention to the challenges that exist to ensure effective and equitable implementation. In the context of research on the application of artificial intelligence (AI) in mathematics education, there is a trend that suggests AI plays an important role in improving student learning experiences and academic outcomes. Various studies have shown that the use of AI, including adaptive learning platforms and chatbots, can provide personalized feedback, increase learning motivation and help students overcome challenges such as math anxiety. Research on the application of AI in mathematics education is mostly found in high-quality (Q1) journals, which shows that the application of artificial intelligence in mathematics education is increasingly recognized as an important research area. Chatbots have been the main focus of AI research in mathematics education, so there are still many opportunities to explore and develop other AI applications. The findings also reflect the trend that AI in mathematics education is focusing more on simplifying basic concepts and direct applications specifically to mathematical topics in general. However, successful integration of AI technologies requires addressing the challenges faced by educators and ensuring that teachers are adequately prepared to utilize these tools effectively. Continued research and collaboration between education experts and AI developers will be critical in realizing the full potential of AI in mathematics education. Further research is needed to explore new ways of utilizing AI to support more inclusive and effective mathematics learning.

Reference

1. Agung, G., Jayantika1, T., & Namur, G. (2022). Peran teknologi pembelajaran dalam meningkatkan literasi digital matematika. *Indonesian Journal of Educational Development*, *3*(2). https://doi.org/10.5281/zenodo.7033331
2. Alvarez, J. I. (2024). Evaluating the impact of AI–Powered tutors MATHGPT and FLEXI 2.0 in enchanging calculus learning. *Jurnal Ilmiah Ilmu Terapan Universitas Jambi*, *8*(2), 495–508. https://doi.org/10.22437/jiituj.v8i2.34809
3. Annuš, N., & Kmeť, T. (2024). Learn with M.E.—let us boost personalized learning in K-12 math education! *Education Sciences*, *14*(7). https://doi.org/10.3390/educsci14070773
4. Bayaga, A. (2024). Enhancing mathematics problem-solving skills in AI-driven environment: Integrated SEM-neural network approach. *Computers in Human Behavior Reports*, *16*, 100491. https://doi.org/10.1016/J.CHBR.2024.100491
5. Boob, A., & Radke, M. (2024). Leveraging two-level deep learning classifiers for 2D shape recognition to automatically solve geometry math word problems. *Pattern Analysis and Applications*, *27*(3). https://doi.org/10.1007/S10044-024-01321-9
6. Chou, C. M., Shen, T. C., Shen, T. C., & Shen, C. H. (2023). The level of perceived efficacy from teachers to access AI-based teaching applications. *Research and Practice in Technology Enhanced Learning*, *18*, 021–021. https://doi.org/10.58459/RPTEL.2023.18021

7. Daher, W., & Gierdien, F. (2024). Use of Language By generative AI Tools in Mathematical Problem Solving: The Case of ChatGPT. *African Journal of Research in Mathematics, Science and Technology Education*, *28*(2), 222–235. https://doi.org/10.1080/18117295.2024.2384676
8. Delima, N., Kusuma, D. A., & Paulus, E. (2024). The students' mathematics self-regulated learning and mathematics anxiety based on the use of ChatGPT, music, study program, and academic achievement. *Infinity Journal*, *13*(2), 349–362. https://doi.org/10.22460/infinity.v13i2.p349-362
9. Dwiyama, F. (2021). Pemasaran pendidikan menuju era revolusi industri 5.0. *Jurnal Manajemen Pendidikan Islam*, *11*(1), 24–34.
10. Getenet, S. (2024). Pre-service teachers and ChatGPT in multistrategy problem-solving: Implications for mathematics teaching in primary schools. *International Electronic Journal of Mathematics Education*, *19*(1). https://doi.org/10.29333/iejme/14141
11. Gouia-Zarrad, R., & Gunn, C. (2024). Enhancing students' learning experience in mathematics class through ChatGPT. *International Electronic Journal of Mathematics Education*, *19*(3), em0781. https://doi.org/10.29333/IEJME/14614
12. Hasanah, U., Safitri, I., Rukiah, R., & Nasution, M. (2021). Menganalisis perkembangan media pembelajaran matematika terhadap hasil belajar berbasis game. *Indonesian Journal of Intellectual Publication*, *1*(3), 204-211. https://doi.org/10.51577/ijipublication.v1i3.125
13. Inoferio, H. V., Espartero, M. M., Asiri, M. S., Damin, M. D., & Chavez, J. V. (2024). Coping with math anxiety and lack of confidence through AI-assisted Learning. *Environment and Social Psychology*, *9*(5). https://doi.org/10.54517/esp.v9i5.2228
14. Lee, I., & Perret, B. (2022). Preparing high school teachers to integrate AI methods into STEM classrooms. *Proceedings of the AAAI Conference on Artificial Intelligence*, *36*(11), 12783–12791. https://doi.org/10.1609/AAAI.V36I11.21557
15. Norberg, K. A., Almoubayyed, H., De Ley, L., Murphy, A., Weldon, K., & Ritter, S. (2024). Rewriting content with GPT-4 to support emerging readers in adaptive mathematics software. *International Journal of Artificial Intelligence in Education*. https://doi.org/10.1007/s40593-024-00420-2
16. Qiu, Y., Pan, J., & Ishak, N. A. (2022). Effectiveness of artificial intelligence (AI) in improving pupils' deep learning in primary school mathematics teaching in Fujian province. *Computational Intelligence and Neuroscience, 2022*. https://doi.org/10.1155/2022/1362996
17. Siagian, H. F. A. S. (2023, March 30). *Mengenal revolusi industri 5.0*. Kementerian Keuangan Republik Indonesia. https://www.djkn.kemenkeu.go.id/kpknl-lahat/baca-artikel/16023/Mengenal-Revolusi-Industri-50.html
18. Sudjana, N., & Rivai, A. (2010). *Media Pembelajaran*. Sinar Baru Algensindo.
19. Thomas, D. R., Lin, J., Gatz, E., Gurung, A., Gupta, S., Norberg, K., Fancsali, S. E., Aleven, V., Branstetter, L., Brunskill, E., & Koedinger, K. R. (2023). Improving student learning with hybrid human-AI tutoring: A three-study quasi-experimental Investigation. *ACM International Conference Proceeding Series*, *1*, 404–415. https://doi.org/10.1145/3636555.3636896
20. Torres-Peña, R. C., Peña-González, D., Chacuto-López, E., Ariza, E. A., & Vergara, D. (2024). Updating calculus teaching with AI: A Classroom Experience. *Education Sciences*, *14*(9). https://doi.org/10.3390/educsci14091019
21. Udias, A., Alonso-Ayuso, A., Alfaro, C., Algar, M. J., Cuesta, M., Fernández-Isabel, A., Gómez, J., Lancho, C., Cano, E. L., Martín de Diego, I., & Ortega, F. (2024). ChatGPT's performance in university admissions tests in mathematics. *International Electronic Journal of Mathematics Education* , *19*(4). https://doi.org/10.29333/IEJME/15517
22. Urban, M., Děchtěrenko, F., Lukavský, J., Hrabalová, V., Svacha, F., Brom, C., & Urban, K. (2024). ChatGPT improves creative problem-solving performance in university students: An experimental study. *Computers & Education*, *215*, 105031. https://doi.org/10.1016/J.COMPEDU.2024.105031
23. Walkington, C., & Bernacki, M. L. (2019). Personalizing algebra to students' individual interests in an intelligent tutoring system: moderators of impact. *International Journal of Artificial Intelligence in Education*, *29*(1), 58–88. https://doi.org/10.1007/s40593-018-0168-1

24. Wardat, Y., Tashtoush, M. A., AlAli, R., & Jarrah, A. M. (2023). ChatGPT: A revolutionary tool for teaching and learning mathematics. *Eurasia Journal of Mathematics, Science and Technology Education*, *19*(7). https://doi.org/10.29333/ejmste/13272
25. Wardat, Y., Tashtoush, M. A., AlAli, R., & Saleh, S. (2024). Artificial intelligence in education: mathematics teachers' perspectives, practices and challenges. *Iraqi Journal for Computer Science and Mathematics*, *5*(1), 20. https://doi.org/10.52866/ijcsm.2024.05.01.004
26. Wu, T.-T., Lee, H.-Y., Chen, P.-H., Lin, C.-J., & Huang, Y.-M. (2024). Integrating peer assessment cycle into ChatGPT for STEM education: A randomised controlled trial on knowledge, skills, and attitudes enhancement. *Journal of Computer Assisted Learning*. https://doi.org/10.1111/jcal.13085
27. Yunianto, W., Lavicza, Z., Kastner-Hauler, O., & Houghton, T. (2024). Investigating the use of ChatGPT to solve a GeoGebra based mathematics+computational thinking task in a geometry topic. *Journal on Mathematics Education*, *15*(3), 1027–1052. https://doi.org/10.22342/jme.v15i3.pp1027-1052

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